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THE THALLEIOQUIN TEST.

BY CHARLES FREDERICK ZELLER.

(From an Inaugural Essay.)

This test, which is one of the most beautiful of the alkaloidal tests, was accidentally discovered by M. J. J. Andre, in 1835. He presented a memoir¹ to the College of Pharmacy of Paris, On the Action of Acid on Quinia, in which he endeavors to explain the cause of the fluorescence of quinia solutions, and then the action of chlorine on these solutions. He considered quinia to be a sort of resinate of ammonia, and in attempting to precipitate the resin, which he supposed to have been acted upon by the chlorine, by means of water of ammonia, he obtained a green precipitate, which was immediately redissolved by the liquid, and communicated to it a rich emerald color.

The name was probably derived from the Greek word "Thallos," meaning green, and quinia or chinin, the English and German words indicating the source from which obtained. As this action of chlorine water and ammonia upon quinia had often been spoken of on account of its extreme delicacy, and also of the influence of the presence of hydrochloric acid upon the delicacy of the test, the following experiments were entered into to determine these points. As both quinia and quinidia are similarly acted upon, solutions of both were used.

A. Solution of Sulphate of Quinia and fresh Chlorine Water.

1. Solution of sulphate of quinia (1 in 1,000) 100 grains, chlorine water 25 drops = 23 grains, liquor ammonia 1 drop = .8 grain, produced green color at once.

2. Solution of sulphate of quinia 100 grains, chlorine water 15 drops, dilute ammonia 1 drop, produced first a green color, then, by carefully

¹"Amer. Jour. Phar.," 1836, p. 212.

shaking up the liquid, there was produced in its stead a beautiful rose color, which in the course of two hours assumed a brownish color, which changed in one week to light yellow.

3. Same as No. 2, and after rose color was produced a second drop of dilute ammonia deepened the color, third drop changed to dark green, and fourth drop a distinct emerald green.

4. Solution of sulphate of quinia 100 grains, chlorine water 10 drops, dilute ammonia 1 drop; same effect as in No. 2.

5. Solution of sulphate of quinia 100 grains, chlorine water 10 drops, dilute ammonia 1 drop, and then 3 more drops were added, which had the same effect as in No. 3.

6. Solution of sulphate of quinia 100 grains, chlorine water 5 drops, dilute ammonia 1 drop, produced green color, light at first, but deepens by standing.

7. Solution of sulphate of quinia (1 in 2,000) 100 grains, chlorine water 5 drops, dilute ammonia 1 drop, gives green color well, but does not change to rose color.

8. Solution of sulphate of quinia (1 in 4,000) 100 grains, chlorine water 5 drops, dilute ammonia 1 drop, gives a light green tint, which fades away in about twelve hours.

B. Solution of Sulphate of Quinidia and fresh Chlorine Water.

1. Solution of sulphate of quinidia (1 part in 1,000) 100 grains, chlorine water 25 drops = 23 grains, liquor ammonia 1 drop = .8 grain; same result as A 1.

2 and 3. Solution of sulphate of quinidia, chlorine water and dilute ammonia, same quantities and same results as A 2 and A 3.

4. Solution of sulphate of quinidia 100 grains, chlorine water 10 drops, dilute ammonia 1 drop, gave green color, did not change to rose.

5. Solution of sulphate of quinidia 100 grains, chlorine water 5 drops, dilute ammonia 1 drop, gave a distinct green color at once.

6. Solution of sulphate of quinidia (1 in 2,000) 100 grains, chlorine water 5 drops, dilute ammonia 1 drop; distinct green, lighter than B 5.

7. Solution of sulphate of quinidia (1 in 4,000) 100 grains, chlorine water 5 drops, dilute ammonia 1 drop, gave only a very light greenish-yellow tint.

The above experiments were performed in order to obtain the smallest amounts of chlorine water and ammonia which would take

part in the reaction; the proportions used by Brande¹ were: 1 grain sulphate of quinia in 100 grains of water, 200 drops of the aqueous solution of chlorine, recently prepared, and 10 or 20 drops of the solution of ammonia. This color is stated and was proven by experiment to be so intense that it can be diluted with twenty thousand parts of water and it will still retain an appreciable green tint. The proportions recommended in the Pharmacographia are: Solution of quinia, or one of its salts, 10 volumes, mixed with 1 volume of chlorine water, and then 1 drop of solution of ammonia is added; in solutions containing less than $\frac{1}{1000}$ of quinia no precipitate is formed. The last-mentioned proportions were tried, but did not produce a perfectly clear liquid. The method of performing the test was as follows: the alkaloidal solution was first poured into the test-tube, the chlorine water then dropped into it, care being taken that none ran along on the side of the test-tube, the drop of ammonia was then dropped into the centre of the liquid; the result was a slight reaction, with the production of white vapors, and a green layer on the top of the liquid, which was then shaken up. The first experiment with both sulphate of quinia and quinidia solutions caused the best and most permanent results, although much smaller amounts of chlorine water and ammonia gave the same results, as may be seen by experiment A 7; the color is not of the same intensity, becoming lighter as the alkaloidal solution decreases in strength. The liquid as thus obtained is of a beautiful emerald-green color, has a slight somewhat ammoniacal odor; by standing, an amorphous dark green substance is deposited, which is insoluble in ether, chloroform and benzin, but soluble in absolute alcohol; when heated it fuses and is decomposed, giving off white vapors having a disagreeable slightly ammoniacal odor. The thalleioquin solution when heated first darkens in color, and is then decomposed, becoming dark brown.

The experiments which now follow were performed in order to ascertain the effect of hydrochloric acid in chlorine water, tables C and D being given first as representing the most natural way in which acid would be present in chlorine water (by decomposition), the others being given to show the amount of acid which would prevent or modify the test. The chlorine water used in tables C and D was over one year old, had been kept in a dark place, in an amber-colored bottle, tightly

¹ "Amer. Jour. Phar.," 1839, p. 37.

corked with a rubber stopper, was nearly colorless, but still had the odor of chlorine; examined by the mercury test before mentioned, it gave an acid reaction with litmus solution.

C. Solution of Sulphate of Quinia and old Chlorine Water, sp. gr. 1.0012.

1. Solution of sulphate of quinia (1 in 1,000) 100 grains, chlorine water 25 drops, solution ammonia 1 drop, gave the emerald-green color.

2. Solution of sulphate of quinia 100 grains, chlorine water 15 drops, diluted ammonia 1st drop produced a green tint, and in a few seconds the solution was almost colorless and required 3 drops more dilute ammonia to bring back a pale green color. (No rose color was produced.)

3. Solution of sulphate of quinia 100 grains, chlorine water 10 drops, dilute ammonia 1 drop, gave a very slight yellowish-green; 3 drops of dilute ammonia were required to bring out the emerald color.

4. Solution of sulphate of quinia (1 in 2,000) 100 grains, chlorine water 5 drops, dilute ammonia 1st drop a very pale green; 4 drops were required to produce a marked green color.

5. Solution of sulphate of quinia (1 in 4,000) 100 grains, chlorine water 5 drops, dilute ammonia 1 drop, and then same as C 4, with same result.

D. Solution of Sulphate of Quinidia and old Chlorine Water, sp. gr. 1.0012.

1. Solution of sulphate of quinidia (1 in 1,000) 100 grains, etc.; same as C 1, with same result.

2. Solution of sulphate of quinidia 100 grains, chlorine water 15 drops, dilute ammonia 1 drop, produced first green, then a light rose tint, which deepened on standing.

3. Same as D 2; a second drop of dilute ammonia brought back green color.

4. Solution of sulphate of quinidia 100 grains, chlorine water 10 drops, dilute ammonia 1 drop, gave green color.

5. Solution of sulphate of quinidia 100 grains, chlorine water 5 drops, dilute ammonia 1 drop, produced a white precipitate.

6. Solution of sulphate of quinidia (1 in 2,000) 100 grains, chlorine water 5 drops, dilute ammonia 1 drop; same effect as C 4.

7. Solution of sulphate of quinidia (1 in 4,000) in same manner as C 4, with same result, the green which was produced being lighter than by D 6.

It will be seen, by looking over these tables, that as the amount of hydrochloric acid was increased the ammonia was proportionately increased also; for instance, fresh chlorine water without acid required 1 drop solution ammonia to produce the emerald-green color and this

Amount of Solution of Ammonia required.

	Old chlorine water.	5 per cent. acid.	10 per cent. acid.	15 per cent. acid.	25 per cent. acid.	50 per cent. acid.
Quinia solution, 2 drops	2 drops	2 drops	3 drops	3 drops	5 drops	scarcely shows
Quinidia " "	"	"	"	"	"	precipitate

seems to prove that after a certain amount of acid has been neutralized the excess of chlorine bleaches out the color, forming a yellow solution, which turns to an amber-brown color if the acid be not present in too large a quantity.

As a matter of interest the bromine water test was tried, having been recommended as being more delicate than chlorine water. A saturated solution of bromine was made by dissolving 12 drops of bromine in 1 fluidounce of distilled water. It was found by experiment that 100 grains of sulphate of quinia or quinidia solution required but 5 drops of bromine water and 1 drop solution ammonia to produce a clear emerald-green color.

To sum up these experiments it may be stated, 1st. That the chlorine water for performing this test should be freshly prepared is not absolutely necessary, *provided* it is preserved in amber-colored glass bottles, tightly corked, and kept in a dark place. Chlorine water which had been kept in this manner over a year gave test color well, as seen in tables C and D. 2d. That hydrochloric acid, when added to *fresh* chlorine water, in quantities not exceeding 25 per cent., does not prevent its giving the test color, but will require a proportionately large amount of ammonia to neutralize the acid so added. 3d. That when hydrochloric acid is present in *old* chlorine water (the result of decomposition) it is due to the loss of chlorine so incurred, that the solution loses its value as a test liquid. 4th. It has been shown that bromine water is about four times more delicate than chlorine water, requiring but one-fifth to one-twelfth as much to produce the same results. 5th. On account of the simplicity and ease with which bromine water can be made, it is very much to be preferred as a means of performing the thalleioquin test.

ARALIA SPINOSA, OR FALSE PRICKLY ASH BARK.

BY LOUIS H. HOLDEN.

From an Inaugural Essay.

The striking difference of the physical characteristics between the barks of false and true prickly ash (*Xanthoxylum*) lies in the appearance of the spines and the fracture of the bark.

The former presenting spines which are quite numerous compared with the latter; they are about one-fourth inch in length, are smooth, slender and tapering to a fine point; their base is round or oval, and arranged in transverse rows.

The latter bark has few spines, scattered irregularly; they are straight and of the same length, but two-edged, with narrow linear base of about three-fourths inch in length.

The false bark breaks with a rather tough but nearly smooth fracture.

The true is brittle, and breaks with a short non-fibrous fracture.

In examining the bark the following is the result of my analysis:

Having reduced the drug to a coarse powder, it was moistened with alcohol and packed in a percolator, exhausted with alcohol, the alcohol was removed by distillation, and the residue evaporated to a solid extract. The extract was mixed with alcohol to the consistency of syrup, then treated with benzin, which removed the fatty matter; this fat is of a dark green color, which is probably due to chlorophyll. The residue was then treated with ether repeatedly, until the portion insoluble in ether, after being dissolved in water, would not answer the tests for tannin.

On examination, I find ether has removed from the extract all of the tannin and resin. Evaporating the ethereal solution to dryness and washing the residue with water, the tannin becomes separated from the resin.

The tannin is precipitated from aqueous solution by acetate of lead; it gives an emerald-green color with salts of iron; with caustic potash it turns ruby-red; the latter color, when acted upon by oxalic acid, is destroyed. The tannin coagulates albumen; it is an astringent, soluble in ether, alcohol and water. The alcoholic extract cannot be detannated with oxide of lead, which the following process will prove. The alcoholic extract was mixed with water; on adding to this oxide of lead, heating, allowing to stand for several days, then evaporating

slowly to dryness, mixing again with water and filtering, then adding fresh oxide of lead and allowing to stand for two months, it still answered to tests for tannin.

The residue from the etherial solution, after washing with water, was found to be resin. It is a brown opaque mass; powdered, it is of a light brown color, solid, brittle, fusible, and volatilized by a high heat; it is slightly acrid, soluble in alcohol and ether, insoluble in water, benzin and chlqroform.

The residue from the alcoholic extract, after being treated with benzin and ether, is entirely soluble in water, from which it is precipitated by acetate of lead in the form of a heavy yellow adherent mass, which carries down mechanically the bitter principle; this can be separated by washing with alcohol. Upon evaporation, a lightish yellow substance, in scale, is obtained, which from the following experiments was proved to be a glucoside; to this the name of Araliin is given. Its solution has no effect on litmus. It is soluble in alcohol and dilute acetic acid, very soluble in water, foaming excessively upon agitation, and the froth being quite persistent; not soluble in benzin, chloroform or ether. Acetate lead has no effect upon its solution; no precipitate is produced by platinic chloride or bichloride of mercury; no action by nitric acid and chromate potash, nor does it answer to any of the tests for alkaloids. Hydrochloric acid bleaches the araliin, and develops the peculiar odor of the plant; the effect of sulphuric acid is similar. Potassium hydrate and ammonia have no effect.

Dissolve araliin in water acidulated with hydrochloric acid; upon boiling, a white, insoluble, tasteless and odorless precipitate is formed, for which I propose the name Araliretin. After filtering, testing filtrate for glucose by cupric sulphate and excess of caustic potash, and boiling, a heavy precipitate of red oxide of copper is formed, showing the bitter principle to be a glucoside. Araliin boiled with potassio-cupric tartrate produced precipitate of red oxide of copper, confirming the preceding test. When araliin is boiled with hydrate potash an amber color is produced.

Upon addition of tannic acid in cold solution no change takes place, but upon the application of heat a flocculent precipitate is formed.

EUPATORIUM PERFOLIATUM.

BY GEORGE LATIN, PH.G.

From an Inaugural Essay.

Eupatorium P. has been analyzed by Peterson (1851) and Bickley (1854); but, as they found nothing but the usual constituents of herbs, the writer thought it would be of some importance to make still further investigations.

The leaves and tops of the plant, reduced to a moderately fine powder, and packed in a percolator, were treated with 95 per cent. alcohol until exhausted. The alcohol was distilled off, and the residue evaporated to the consistence of an extract by a very gentle heat. This extract was then treated with ether, which dissolved out the bitter principle and coloring matter, leaving a grayish, gummy-like mass, entirely soluble in water, and proved, by Trommer's test, to be sugar.

The ethereal tincture was then placed in a flask, and the ether carefully distilled off by means of a water-bath, and evaporated to a semi-solid consistence, which was then treated with petroleum benzin, by means of which a large amount of coloring matter, fat, etc., was removed. The benzin solution, upon being permitted to evaporate spontaneously, yielded a number of small crystals in an impure condition, which adhered to the sides of the vessel. These were washed very rapidly with petroleum benzin and then with ether, which left them in the form of pure white needle-shaped tasteless crystals, and were insoluble in alcohol, ether, water and alkaline solutions. When treated with sulphuric and nitric acids separately no change was produced, but subjected first to the action of nitric and then with sulphuric acid a beautiful carmine-red was produced, changing after a short time to an orange-yellow; with hydrochloric acid a beautiful emerald-green, and with potassium bichromate with sulphuric acid a greenish-violet was developed. Heated to redness on platinum foil, no residue is left and no odor given off. The crystals have a comparatively low fusing point; on placing a few of them on a piece of note-paper, and holding them over the flame of a Bunsen burner, they melt, leaving a greasy stain, but not sufficiently strong to render the paper transparent.

This being, so far as the writer is aware, the first crystalline principle obtained from *Eupatorium P.*, it was a difficult matter to decide exactly what was the nature of the crystals, as the quantity was very

small; but, so far as examination enabled me to form an opinion, I judged them to be either wax or resin.

The residue left after treating with benzin was then dissolved in alcohol and filtered. Upon the filter there was left a black powder, which was unaffected by alcohol, water, alkalies and concentrated acids, and when heated was consumed, leaving an ashy residue.

The filtrate was then treated with an alcoholic solution of acetate of lead, which caused a copious precipitate of coloring matter; this was separated by second filtration, and the liquid treated with sulphuretted hydrogen (H_2S), by which the lead was eliminated. The liquid being boiled, was thus freed from sulphuretted hydrogen. After this, purified animal charcoal was left in contact with it for three days, the whole being shaken occasionally. By this means the solution was nearly deprived of color; it was then concentrated and treated with boiling water until all bitterness was removed, and the residue was a resinous, tasteless mass.

The aqueous solution thus obtained was again evaporated and treated with chloroform, which dissolved out a bitter principle and left a tasteless resin-like mass in the vessel.

The chloroformic solution, when evaporated, left the bitter principle in a pure condition, and was named Eupatorine. When tested by Trommer's test it gave no reaction, but when first boiled with sulphuric acid it gives a red-colored precipitate, and by sulphuric acid alone a white precipitate was occasioned, showing it to be a glucoside.

Eupatorine has a little acid taste, soluble in alcohol, chloroform, ether, boiling water and concentrated acids; with sulphuric acid a dark reddish-brown color is produced, and with hydrochloric and nitric acids a light yellow color results.

Eupatorine, when pure, is wholly dissipated by heat, and when boiled with sulphuric acid and water the odor of raspberries is given off.

Aqueous Percolate.—After the herb was treated with alcohol it was exhausted with water, and the solution evaporated to the consistence of an extract, having an astringent taste, and giving the following reactions: With ferric chloride, a dark-green color was produced; with solution of gelatin, a light brown precipitate was formed, and by placing this in a filter, and washing it with cold water several times, ferric chloride gave a dark color to that part of the filter that had been in contact with the precipitate, proving the presence of tannin; with tartar emetic, no precipitate. Alcohol gave a precipitate of gum from an

aqueous solution. Five grams of the herb, when exhausted with sulphuric ether, upon evaporating yielded an extract weighing 54 centigrams, having no bitter taste, and nearly all soluble in benzin, supposed to be coloring matter. A small quantity of volatile oil was obtained by distilling the herb with water, having the disagreeable odor of boiled cabbage. Five grams of the herb lose 37 centigrams of moisture when heated to dryness.

The chemical constituents of the herb are as follows:

Eupatorine (a glucoside), a crystallizable body, a volatile oil, gum, tannic acid, sugar.

ON IODOSULPHATE OF CHINIOIDIN AS AN EXCELLENT REAGENT FOR THE QUALITATIVE AND QUANTITATIVE DETERMINATION OF QUINIA.

By DR. J. E. DE VRIJ.

Since my publication in the "Pharmaceutical Journal and Transactions" of December 11, 1875, p. 461, of a paper on this subject, my repeated application of the above mentioned reagent to the analysis of cinchona barks induced me to make some slight alterations in the process, so that it may now be useful to readers of this journal for me to publish my actual method of applying it. I am the more induced to make this publication, as recently an American chemist requested me to give him some information about the accurate estimation of quinia when it is mixed with a large amount of the other cinchona alkaloids.

Preparation of the Reagent.—One part of commercial chinioidin and two parts of benzol are heated together on a water-bath, whereby a solution of chinioidin in benzol is obtained. The clear solution is, after cooling, poured off from the insoluble part and agitated with an excess of diluted sulphuric acid, which, combining with the chinioidin dissolved in the benzol, yields a reddish-yellow solution of acid sulphate of chinioidin; to this clear solution, contained in a capsule, a solution of one part of iodine and two parts of iodide of potassium in 50 parts of water is *slowly* added with continuous stirring so that no part of the solution of chinioidin comes into contact with an excess of iodine. One part of iodine is required for two parts of chinioidin contained in the acid solution. By this addition an orange-colored flocculent precipitate is formed of iodosulphate of chinioidin, which either spontaneously or by a slight elevation of temperature collects into a dark brown-red colored resinous substance, whilst the supernatant liquor

becomes clear and slightly yellow colored. This liquor is poured off¹ and the resinous substance is washed by heating it on a water-bath with distilled water. After washing, it is heated on the water-bath till all the water has been evaporated. It is then soft and tenacious at the temperature of the water-bath, but becomes hard and brittle after cooling. One part of this substance is now heated with 6 parts of alcohol of 92 or 94 per cent. on a water-bath, and is thus dissolved, and the solution allowed to cool. In cooling, a part of the dissolved substance is separated. The clear, dark-colored solution is evaporated on a water-bath and the residue dissolved in 5 parts of cold alcohol. This second solution leaves a small part of insoluble substance. The clear solution obtained by the separation of this insoluble matter, either by decantation or filtration, constitutes the reagent which I have used since the beginning of 1875 under the name of "iodosulphate of chiniodin," both for the qualitative and quantitative determination of crystallizable quinia.

Application of the Reagent to the Quantitative Estimation of Quinia.—

The mixed alkaloids obtained from any species of cinchona bark are treated with ether, the quantity of which depends on the amount of quinia contained in the mixture; 10 to 20 parts of ether will be found sufficient for the treatment of one part of mixed alkaloids. By this treatment the mixed alkaloids are divided [into] two parts, viz.: In a part soluble in ether and in a part insoluble in this liquid. The part soluble in ether contains chiefly quinia and amorphous alkaloid (chiniodin), besides traces of the other crystalline alkaloids. To estimate the quantity of quinia, one gram of the part soluble in ether is dissolved in 40 grams of acidulated alcohol of 92 or 94 per cent., containing 0.755 per cent.² of H_2SO_4 , to obtain an alcoholic solution of the acid sulphate of quinia. From this solution the quinia is separated by adding carefully, by means of a pipette, the before-mentioned reagent as long as a dark brown-red precipitate of iodosulphate of quinia (herapathite) is formed. As soon as all the quinia has been precipitated and a slight

¹ To prevent the use of an excess of iodine I have prescribed on purpose not enough iodine to precipitate all the chiniodin in the form of iodosulphate. Therefore the liquor contains still chiniodin which can be obtained in a very pure state if a little sulphurous acid is added before precipitating the alkaloid by caustic soda.

² This quantity is quite sufficient to transform the alkaloids into acid sulphates, and ought not to be increased, for an excess of acid would increase the solubility of the herapathite in alcohol.

excess of the reagent has been added, the liquor acquires an intense yellow color. The beaker containing the liquid with the precipitate is now covered by a watch-glass and heated on a water-bath till it begins to boil. After a night's standing, the beaker is weighed to ascertain the amount of liquid, which is requisite in order to be able to apply later a necessary correction. For, although the iodosulphate of quinia is very little soluble in alcohol, it is not absolutely insoluble,¹ and therefore a correction must be applied for the quantity which has been dissolved, both by the alcohol used for the solution of the alkaloids and the alcohol contained in the reagent. The liquid is now filtered to collect the herapathite on a small filter, where it is washed with a saturated solution of herapathite in alcohol.² After the washing has been completed, the weight of the funnel with the moist filter is taken and the filter allowed to dry in the funnel. As soon as it is dry the weight is taken again to ascertain the amount of solution of herapathite which remained in the filter, and which left the dissolved herapathite on the filter after the evaporation of the alcohol. This amount is subtracted from the total amount of the liquid, and for the remainder the correction is calculated with reference to the temperature of the laboratory during the time of the analysis. The dry iodosulphate of quinia is taken from the filter and dried on a water-bath between two large watch-glasses closing tightly upon each other, so that the weight of the substance contained in the glass may be taken without the access of the air. When, after repeatedly ascertaining the weight, it remains constant, this weight is noted down and to it is added the product of the calculated correction. The sum of this addition is the total amount of iodosulphate of quinia obtained from the part soluble in ether of the mixed alkaloids subjected to the operation, and from this weight the amount of *crystallizable* quinia can be calculated by the use of Jörgensen's formula, $4C_{20}H_{24}N_2O_2, 3H_2SO_4, 2HI, I_4$. According to this formula 1 part of iodosulphate of quinia, dried at

¹ Jörgensen found that at a temperature of 61°F. 1 part of alcohol dissolves, on an average, 0.00125 part of herapathite.

² For my bark analyses I always keep a supply of this solution, made by putting an excess of herapathite, dried at 212°F., into alcohol of 92 or 94 per cent. and shaking from time to time. The temperature of the laboratory in which the analysis is made is quite indifferent, provided that it is noted and does not change during the operation. It is clear that the amount of herapathite dissolved at *that* temperature in the alcohol must be ascertained, as this quantity varies with the temperature.

212°F., represents 0.55055 parts of pure anhydrous quinia, or 0.734 parts of pure disulphate of quinia.

Although I feel convinced that this process of estimating the amount of quinia in a mixture of cinchona alkaloids is not one which, *even in the hands of inexperienced persons, will give accurate results in a short time*, I have some hope that in the hands of experienced analysts it may prove a satisfactory one, if, before applying it, they study, as I have done, the action of the reagent upon solutions of 1 gram of quinia, quinidia, cinchonia and cinchonidia, each of them separately in 40 grams of the above-mentioned acidulated alcohol. If they do so they will find that the iodosulphates of quinia and of quinidia thus obtained have an analogous composition, and are identical with the compounds described by Herapath,¹ whilst the iodosulphates of cinchonia and cinchonidia have a different composition from the former, and both require more iodine to be transformed into the optical iodosulphates described by Herapath. In the meantime they will find that of all these iodosulphates, that of quinia is the most insoluble in alcohol, and is therefore precipitated the first of all and *alone* by a judicious addition of the reagent. Therefore the purity of the obtained iodosulphate of quinia can be easily tested by dissolving it in boiling alcohol and letting it crystallize by cooling. If the quinia-herapathite be really pure the mother-liquor will only be slightly lemon-colored, and if evaporated on water-bath 100 parts of the mother-liquor at 61°F. will leave not more than 0.125 parts of residue.

That the reagent can also be applied to test the commercial value of the various sulphates of quinia of commerce will be easily understood by carefully studying the process.

Soon after the first publication of my process in the "Pharmaceutical Journal" Prof. Jörgensen of Copenhagen published in "Journal für Praktische Chemie" a classical paper, "Ueber den sogenannten Herapathit und ähnliche Acid Perjodide," in which he describes not less than 7 crystallized compounds of quinia with iodine and sulphuric acid. The reading of this very elaborate paper not only explained to me the causes of the different results obtained by me by the addition of a solution of iodine to an acid solution of sulphate of quinia in alcohol, but induced me also to send a sample of my reagent to Prof. Jörgensen with the request to try it and to investigate the composition of the

¹ "Proceedings of the Royal Society," vol. ix, p. 10.

iodosulphate of quinia obtained by my reagent. He kindly informed me that *even 5 milligrams* of quinia were detected after 24 hours by the application of my reagent, and that the composition of the precipitated iodosulphate agreed to the formula $4C_{20}H_{24}N_2O_{23}3H_2SO_4, 2HI, I_4$.

The Hague, July 5, 1880.

CHEMICAL NOTES.

BY PROF. SAMUEL P. SADTLER, PH.D.

Inorganic Chemistry.—Occurrence of Lakes of Sodium Sulphate in Russian Caucasus.—In this district, in the neighborhood of the small town of Batalpachinsk, there are two lakes which cover considerable layers of sodium sulphate, and from which the salt is obtained in an almost pure state. The lakes have no exit; during the rainy season they fill up, and in summer their contents are partially evaporated. The sulphate contained in the water separates partly in consequence of cold weather, and is then gotten in layers of $\frac{1}{2}$ inch to 4 inches in thickness, which are called *Kruga* by the natives, and another part separates as a result of summer surface evaporation. Samples taken by Gauthier, and analyzed, showed that the dry salt contained 95 per cent. pure sulphate. According to a calculation of Gauthier, the water of these lakes should yield some 260,000 tons of the salt. A company has been organized in Paris to work this deposit systematically, and bring it to market.—*Chem. Indus.*, iii, p. 167.

Analysis of Virginia Rock Salt.—According to B. E. Sloan, the rock-salt of Saltville, Va., has the following composition:

NaCl,	89.21
Kcl,	trace
CaSO ₄ 2H ₂ O,	4.86
Fe ₂ O ₃ ,	0.84
SiO ₂ ,	4.53
	<hr/> 99.44

Strontium, barium and lithuim were absent.—*Chem. News*, vol. 40, p. 187.

On the Action of Caustic Soda upon Cast Iron.—It is a well-known fact that cast-iron vessels in which caustic soda has been repeatedly fused are gradually attacked, while there forms a porous, spongy mass. According to H. Brunk and C. Graebe, the walls of such vessels in which caustic soda has been heated for some time to a dull red-heat,

become affected to a depth equal to the thickness of a finger, the iron being changed into a friable mass, which consist essentially of dark bluish-violet crystalline scales. Two samples of these were found to consist of:

Ferric oxide,	88.01	87.92
Manganic oxide,	1.61	1.66
Water,	10.11	10.30

corresponding to the formula $H_2Fe_2O_4$.—*Ber. der Chem. Ges.*, xiii, p. 725.

Purification of Sulphuric Acid from Arsenic.—According to F. Selmi, sulphuric acid can be readily freed from arsenic if the sulphuric acid, diluted with half its bulk of water, be distilled after addition of some plumbic chloride. All the arsenic goes over with the first portions of the distillate as arsenic chloride.—*Ibid.*, p. 206.

Preparation of Phosphoric Acid.—Phosphoric acid may be readily prepared by covering a stick of vitreous phosphorus with water, adding a crystal or two of iodine and some nitric acid, and allowing the mixture to stand for 24 to 36 hours. After the oxidation is complete the solution is evaporated and treated as the Pharmacopœia directs. The advantages presented by this method are economy of material and consequent safety, and the indefinitely large quantities of phosphorus which can be oxidized by a very small quantity of iodine. The theory of the process is based on the discovery of Brodie ("Jour. Chem. Soc.," 1852, p. 289), that the iodine converts the vitreous phosphorus into the amorphous variety which is oxidized by the nitric acid. This method differs from that of Pettenkoffer, who treats phosphorus iodide with water, and obtains phosphorus acid which is oxidized by nitric acid.—*Phar. Jour. and Trans.* [3], 10, p. 468.

Preparation of Phosphates.—A great technical advance frequently carries with it minor improvements in its wake. Such is the case with the newly-devised process of the English metallurgist, Sidney Gilchrist Thomas, for dephosphorizing iron ores. The elimination of the phosphorus from the cast-iron in this process is effected by lining the furnaces with a very basic fire-brick, rich in magnesia. Thomas has just patented in England a process for recovering from the slags all the phosphate so formed. The slags are broken up and treated with hydrochloric acid. The filtered solution is then evaporated and the residue calcined at low temperatures to drive out the adhering hydrochloric acid, without decomposing, however, the ferric or man-

ganous chloride. The chlorides of iron, manganese and lime are then washed out with water, and the residue forms a concentrated basic phosphate.—*Ber. der Chem. Ges.*, xiii, p. 1150.

Organic Chemistry.—On Dynamite Gelatin.—This new and interesting compound consists of 86.4 per cent. nitro-glycerin, 9.6 per cent. of dissolved gun-cotton, and 4 per cent. camphor. Despite the large percentage of nitro-glycerin, it is distinguished by an unusual power of resisting heavy blows, and it requires for its explosive decomposition a cartridge of fulminating mixture, containing 15 to 20 grams of dynamite. Comparative experiments made in the St. Gothard Tunnel showed that the effective value of dynamite-gelatin was more than half as much again as that of dynamite No. 1. Thus, there proved to be of equal power: 1 part of dynamite-gelatin, 1.10 parts of nitro-glycerin, 1.50 parts of dynamite No. 1, 2.15 parts of dynamite No. 2 and 3, and 4.5 parts of ordinary powder.

Dynamite-gelatin, in contact with a burning body, burns like common dynamite without detonation. Two pieces of dynamite-gelatin maintained their full explosive power even after lying 12 days under water. A blow of 20,000 kilograms per square mm., struck by a steam hammer, did not produce an explosion, even when repeated six times; on the contrary, the gelatin began to burn.—*Chem. Industrie*, iii, p. 173.

Composition of Pyroxylin.—J. M. Eder has studied the properties of five cellulose nitrates.

Cellulose hexanitrate, $C_{12}H_{14}O_4(NO_3)_6$, is prepared by immersing dry cotton-wool in a mixture of 3 volumes of sulphuric acid (sp. gr. 1.845) and 1 volume of nitric acid (sp. gr. 1.5) at a temperature of 10° for 24 hours. The product is thoroughly washed with cold and finally with hot water. 100 parts of cotton yield from 175 to 180 of pyroxylin. The gun cotton contains from 1.2 to 5.8 per cent. of penta- and tetranitrate, which may be removed by repeated digestion with a mixture of ether and alcohol (3:1). The hexanitrate is insoluble in ether, alcohol, acetic acid, methyl alcohol, ethyl alcohol and ethyl acetate. Thoroughly washed gun-cotton may be heated at 100° for several days without undergoing any change; its temperature of ignition is between 169° and 170° . Attempts to prepare the hexanitrate by treating the cotton with nitre and sulphuric acid did not yield satisfactory results.

Cellulose pentanitrate, $C_{12}H_{15}O_5(NO_3)_5$, is formed together with the tetranitrate by digesting cotton-wool for five hours at the ordinary

temperature in a mixture of equal volumes of strong sulphuric and nitric (sp. gr. 1.4) acids. The product is washed and treated with ether to which a small quantity of alcohol has been added; in a few days a gelatinous mass is obtained, which is poured into three times its volume of alcohol, when the pentanitrates separates out, leaving the lower nitrates in solution. The pentanitrates can also be obtained by dissolving collodion-cotton in nitric acid (sp. gr. 1.4) at 60°; the turbid solution is cooled down to 0°, filtered through asbestos, and the filtrate is mixed with four times its volume of sulphuric acid (sp. gr. 1.84), care being taken to keep the mixture cool. The acid-liquid is then diluted and the precipitated pentanitrates filtered and purified by solution in alcoholic ether and reprecipitation in water. This compound is insoluble in alcohol and in ether, but dissolves in ether-alcohol, in acetic acid and in ethyl acetate.

Cellulose tetra- and tri-nitrates, $C_{12}H_{16}O_6(NO_3)_4$, and $C_{12}H_{17}O_7(NO_3)_3$, have not yet been obtained in the pure state. The tetranitrates is insoluble in alcohol and in ether, but dissolves in methyl alcohol, ethyl acetate, alcoholic ether and in a mixture of acetic acid and alcohol, or acetic acid and ether. The trinitrate dissolves freely in ethyl-acetate, methyl alcohol and boiling acetic acid. It is slowly dissolved by absolute alcohol and the solution becomes turbid on the addition of ether in excess.

Cellulose dinitrate, $C_{12}H_{18}O_8(NO_3)_2$, is formed by the action of ammonia or potash on the higher nitrates. It is also prepared by adding alcoholic potash to collodion; the product is diluted with water and neutralized with acetic acid, when the dinitrate is precipitated. After being dissolved in alcoholic ether, it forms a yellowish-white powder which explodes at 175°. It is soluble in alcoholic ether, absolute alcohol, methyl alcohol, acetic acid, ethyl acetate and also in potash, but with partial decomposition. The solution in alcoholic ether deposits an opaque film on evaporation. The dinitrate appears to form compounds with alkalies, which are insoluble in alcoholic ether, but dissolves in water. The cellulose mononitrates could not be obtained.—*Ber. der Chem. Ges.*, xiii, p. 169.

On the Mydriatic Character of the Tropeins or Artificial Alkaloids.—We have noticed several times the work of Ladenburg on these interesting compounds (this journal, current vol., pp. 148, 198 and 367). Of the several tropeins, or compounds of tropin with acid radicals, *salicyl-tropein* did not dilate the pupil of the eye at all; *benzoyl-tropein* did have

mydriatic action, but in a lesser degree than atropin or hyoscyamin; while *oxytoluyt-tropein*, or because of its analogy to atropin, called *homatropin* by the author, possessed this power quite strongly.

The author has had it tested in the eye-clinics at the University of Kiel and reports more particularly upon its action. Although just about as energetic as atropin it acts much quicker, so that its effect passes off in 12 to 24 hours instead of 8 days as in the case of atropin. The homatropin is then much to be preferred in eye-clinics to atropin. Prof. Quincke has also found that homatropin is a much weaker poison than atropin, so that for this reason it is again to be preferred.—*Ber. der Chem. Ges.*, xiii, p. 1088.

ARALIA SPINOSA.

BY CHARLES WILLIAM ELKINS.

Extract from an Inaugural Essay.

The *Aralia spinosa* is a small tree cultivated to some extent in the Northern States for ornamental purposes, but is indigenous to the Southern States, where it often attains the height of from thirty to sixty feet. All parts of this plant are employed, particularly in the South, for medical purposes, but the bark alone is officinal in the United States Pharmacopœia.

I submitted the bark to an examination and obtained the following results:

A decoction of the bark, prepared by boiling a half ounce in eight fluidounces of water, gave, upon the addition of iodine to a portion of it, the characteristic blue color, denoting the presence of starch.

By Trommer's test glucose was detected in this decoction.

A portion of the decoction, after being acidified with muriatic acid, gave, upon the addition of a small quantity of Mayer's solution (iodohydrargyrate potassium), a white precipitate, thus showing the presence of an alkaloid; but this could not be obtained in a crystalline state, as will be shown presently.

There was also obtained from this decoction gum, which was precipitated from solution by subacetate of lead.

The absence of tannin was proven by appropriate tests, as was also albumen in the cold infusion, by not being coagulated upon being heated. In the hot infusion the same principles were found as in the decoction.

One hundred grains of the bark, exhausted by stronger alcohol, gave a rich, reddish-brown tincture, possessing an acrid taste. Upon the evaporation of this tincture there remained 18 grains (18 per cent.) of extract, which was insoluble in water, thus showing its resinous nature, and which possessed a very acrid taste.

About one third of this extract was dissolved when submitted to the action of ether, this part possessing a more acrid taste than the remaining portion.

The portion which was insoluble in ether was soluble in alkaline solutions.

The acrid taste of the bark, therefore, is due to two resins, which are very similar in taste to the resin obtained from Pellitory root. The bark contains pectin, which was obtained from the acid decoction by treating with milk of lime, when a large quantity of this substance was precipitated.

By the following process the bitter principle of the bark was obtained.

Four troyounces of the bark were exhausted, with successive portions of water and muriatic acid; milk of lime was then added, which precipitated the pectin.

The filtrate from this was then evaporated to a syrupy consistence and a mixture of equal parts of alcohol and ether added. Upon the evaporation of the alcohol and ether the bitter substance was left in the form of a yellowish, semi-transparent mass. A small quantity of the mass was then dissolved in a little distilled water and the filtered solution set aside. On the evaporation of the liquid no crystals could be discovered in the residue.

It was, therefore, redissolved in water slightly acidulated with muriatic acid and again evaporated, when the mass was still found to be amorphous.

It was finally dissolved in water and the acid solution tested with the reagent for alkaloids (Mayer's solution), with the result of giving a very decided precipitate. I also succeeded in isolating this principle from the bark by the following process, which is somewhat different from the above:

Four troyounces of the bark were exhausted with alcohol and two pints of tincture obtained. This was evaporated to four fluidounces, an equal bulk of water added, which precipitated all the resinous matter.

The liquid was then filtered, and to the filtrate was added ammonia in excess, which changed it to a darker color.

Chloroform was then agitated with the ammoniacal solution in separate portions, being allowed to remain in contact each time for five or six hours, with frequent agitation, then separated and evaporated spontaneously, when a yellowish, bitter mass was left, similar to that obtained by the first process, and was soluble in water and ether.

It was dissolved in water acidulated with muriatic acid, filtered, evaporated and set aside, with the expectation that it would crystallize, but it refused to do so.

This principle, therefore, to which the bark owes its bitter property, seems to be an uncrystallizable alkaloid of some kind, which deserves more time and attention.

By distillation with water the bark yields a small quantity of volatile oil, which oil, therefore, gives to the bark its aromatic property.

By incineration the bark yields between three and four per cent. of ash.

The ash obtained from three hundred grains of the bark was digested in a half ounce of water and filtered.

To a portion of the filtrate a strong solution of tartaric acid was added, and at the end of an hour crystals of bitartrate of potassium were found to be present, proving the presence of potassium salt.

To another portion of the filtrate a solution of oxalic acid was added, which occasioned a white precipitate and refused to dissolve in an excess of acetic acid, thus proving the presence of calcium salts.

The organic constituents of the bark are starch, glucose, gum, pectin, two acrid resins, volatile oil and an alkaloid.

ERIODICTYON CALIFORNICUM.

BY WILLIAM C. HOLZHAUER.

(*From an Inaugural Essay.*)

The leaves, exhausted by stronger alcohol and then by water, yielded the following results:

1. The alcoholic percolate, evaporated to the consistence of an extract, yielded, by distillation with water, a small amount of volatile oil, lighter than water, of a pale straw color, aromatic taste and odor, but slightly resembling that of the leaves. The distillate was neutral

to test paper. On boiling the alcoholic extract with water and allowing the liquid to cool a crystalline substance of a yellowish-white color and of a feathery appearance deposited, destitute of taste and odor, insoluble in cold water and benzin, sparingly soluble in hot water (the solution having a slight acid reaction), very soluble in chloroform, ether and alcohol.

No alkaloids could be detected in the aqueous decoction.

The remainder of the aqueous decoction was then treated with a solution of acetate of lead, as long as a precipitate was thereby produced, then filtered. The precipitate, having previously been thoroughly washed with cold water, was then diffused through alcohol and decomposed by means of sulphuretted hydrogen, filtered, and the filtrate evaporated to dryness at a low temperature. The residue was a brittle substance of a light brown color, having an astringent, sour taste, proven to be tannin, the alcoholic solution of the tannin being perfectly clear, while that of the aqueous solution was turbid, and on the addition of ammonia or potassic hydrate turned to a dark brown color and became perfectly clear. The tannin gives a green precipitate with chloride of iron, acquiring a dirty appearance on standing.

2. Previously having treated the leaves with alcohol they were then percolated with water. The percolate was of a dark brown color, bitterish, astringent taste and having a slight acid reaction. After concentrating the percolate a part of it was treated with absolute alcohol, producing a precipitate of a dark brown color, wholly soluble in water, and proven to be gum associated with brown coloring matter. The presence of sugar was detected by means of Trommer's test.

No alkaloids could be detected. A portion of the percolate was then treated with a solution of acetate of lead as long as a precipitate was thereby formed. The precipitate, collected on a filter and thoroughly washed with water, was then diffused through alcohol and decomposed by sulphuretted hydrogen, filtered and the filtrate slowly evaporated to dryness by means of gentle heat. The product obtained was tannin, similar in appearance and corresponding in all its reactions to that obtained from the alcoholic percolate.

3. A fresh quantity of leaves was exhausted by ether.

The ethereal percolate was allowed to evaporate spontaneously to the consistence of syrup.

On boiling this with water a resinous mass was precipitated. The supernatant liquid was of a pale straw color, slight aromatic taste and

odor and of an acid reaction. Evaporating the supernatant liquid and allowing to cool crystals were obtained similar to those of the alcoholic extract, the quantity being too small to allow further investigation.

Examination of the Resinous Precipitate.

By treating with stronger boiling alcohol and allowing to cool a soft, greenish, waxy substance separated, forming a pellicle. This substance was freed from coloring matter by continued washing with cold alcohol. The residue was proven to be vegetable wax, possessing a slightly greenish tinge. After treating the resinous precipitate with boiling stronger alcohol there remained a soft, sticky substance, having neither taste nor odor, but slightly soluble in benzin and ether, readily soluble in chloroform, and from this solution was reprecipitated on the addition of alcohol, not volatile, burning with a sooty flame, which experiments prove its being identical with caoutchouc.

The remaining alcoholic liquid was of a dark green color; boiling, then digesting this liquid for 24 hours with animal charcoal, filtering, subsequently evaporating by gentle heat, a brittle resin was obtained of an amber color, aromatic, slightly bitter taste and faint odor.

PHARMACEUTICAL NOTES.

BY R. F. FAIRTHORNE, PH.G.

Benzoic Acid Pills.—Benzoic acid is one of those substances, of a class that, on account of difficult solubility in water, makes it desirable to find some method by which it can be administered without the disagreeable effect which follows each dose of the mixture when swallowed. The unpleasant effect referred to arises from particles of the acid adhering to the throat and palate, and remaining there for some time on account of partial insolubility. This difficulty can be avoided by giving it in the pilular form. Now, it so happens that some of my pharmaceutical friends have not been able to find a suitable excipient for making benzoic acid pills, and, having been applied to by one of them, I have tried a number of substances, and found two, either of which will make a good pill mass with that acid. They are balsam of fir and Castile soap. Of the former a few drops are sufficient to make a plastic mass with a drachm of benzoic acid; of the latter, I find that it requires 1 grain for 7 grains of the acid. Of course, a little water is added to the soap. By either of these means a perfectly satisfactory

pilular mass can be made. Some one may possibly object to the use of soap on account of soda present, forming benzoate of soda, but but when the small amount formed is considered the objection will be seen to be too trifling to notice.

Elixir of Valerianate of Ammonia.—

R Ammoniae valerianatis,	3iii gr. xii
Syrupi,	f 3iii
Alcoholis,	f 3i & 3vi
Tr. cardam. comp.,	f 3iss
Ext. aurantii cort. recentis,	f 3i
Liq. ammoniae,	q. s.
P. coeci,	3i
Aquae,	q. s. ut fiat f 3xii

The difficulty of making an agreeable elixir is owing to the fact that the valerianate is nearly always acid, and it is necessary that it be accurately saturated. This is accomplished by dissolving the salt in about 3 ozs of water and adding solution of ammonia, and determining neutrality by means of litmus paper, using both the red and blue paper. When thus neutralized it is filtered through paper or cotton, then the rest of the ingredients added, and again filtered.

To Deodorize Benzin.—If to each gallon of benzin 3 ozs. of powdered quick lime are added, and well shaken, a great deal of the peculiar sulphuretted odor will be removed, and articles that have been washed in it will have no disagreeable smell. This is no small advantage. The addition of freshly burnt charcoal may also be made with advantage.

Colors for Shop Windows.—A very beautiful amethystine color can be produced by dissolving 5 grains of salicylic acid in a little solution of ammonia, mixing this with two gallons or enough water to fill the show bottle. To this is added a few drops of solution of chloride of iron, and afterwards a few drops of muriatic acid.

Emerald-green color, of great beauty, can readily be produced by dissolving a few five cent nickel pieces in equal parts of nitric acid and water, then diluting with sufficient water.

How to Purify Muddy Water.—The excessive muddiness of the water supplied to the inhabitants of this city, and the difficulty experienced in filtering it clear, led me to make several experiments, with the object of obtaining transparent water, free from impurities. After many fruitless or only partially successful efforts, I found the following

plan to succeed admirably, namely, to agitate each quart of water with an ounce of phosphate of lime, and allow it to settle. This only requires a few minutes, and it will be found that most of the impurities are carried down to the bottom. The supernatant water is now filtered without any trouble through absorbent cotton. Ordinary cotton will answer as well, if previously moistened with alcohol and then washed with water. Of course, either of them must be pressed tightly into the neck of a funnel. By this means perfectly clear water can be obtained in about five minutes.

A Good Filling for Teeth.—A filling that has been used very successfully for teeth, and which is next to gold leaf in permanency, is made of the following ingredients:

R	Oxide of zinc (recently made by burning),	200 parts
	Powdered silica,	8
	borate of soda,	4
	glass,	5

Mix and pass through a very fine sieve. To be kept in a well stoppered bottle.

When required for use, a little of the powder is mixed quickly with a concentrated solution of chloride of zinc, so as to make a thick paste, which is pressed into the cavity of the tooth, and will harden in less than ten minutes. It forms a hard white cement, which will last for years.

Cosmetic Pomade can be made by the following formula:

White wax,	4½ ozs. avoird.
Lard,	4½
Balsam of Peru,	1 drachm
Oil of orange flowers,	30 drops
lavender,	5
cloves,	6
rosemary,	5

Melt the lard, wax and balsam, and stir them constantly until they thicken, when the oils are added. This is then poured into moulds; when cold, wrap up each stick in wax paper and tinfoil.

Black stick pomade is made by mixing 40 grains of best lampblack, carefully rubbed up with a portion of the lard.

Brown, by using burnt sienna in same way, and various shades of brown, by mixing burnt sienna with lampblack.

Camphoric Acid can be produced by boiling camphor with fifteen or sixteen parts of strong nitric acid, in a suitable glass vessel, for twenty

or twenty-four hours, when, upon cooling, the camphoric acid will be found floating on the top of the acid as a crystalline cake. This is removed and carefully washed with ice-cold water, when it will be found to consist of a mass of acicular snow-white crystals.

Camphorate of Ammonia.—This salt is easily produced by neutralizing camphoric acid with liq. ammonia fortior, evaporating by a very moderate heat until reduced to a syrupy liquid, and a pellicle begins to form, when it is set aside in a cool place to crystallize. It is a beautifully crystalline salt, consisting of masses of crystals, radiating from central points, arranged in the most symmetrical manner.

It is a salt that has sedative properties resembling the monobromide of camphor, but, unlike that compound, it is freely soluble in water. The dose is from 5 to 10 grains.

Elixir Protochloride of Iron.—Rabuteau's elixir having obtained considerable celebrity, I have made a substitute by the following formula :

Take of Protochloride of iron,	3 drs. 12 grs.
Glycerin,	4 fl. ozs.
White curacao,	12
Syrup,	4
Water,	sufficient to make 2 pints.

Mix and filter.

Waterproof Cement.—A good waterproof cement, suitable for mounting minerals, etc., and useful for aquariums, can be made by the following :

Take of Gutta percha, in chips,	4 ozs.
Brushmakers' pitch,	8
Shellac,	1

Melt in an iron capsule, on a sand-bath, and stir together. Pour out on a wet slab and roll into sticks.

ARIZONA SHELLAC.

At a recent meeting of the California Academy of Sciences Professor Stillman read a paper on the gum and coloring matter found on the *Acacia Greggii* and the *Larrea Mexicana* or creasote plant. The gum which exudes from these plants is very abundant, and is the product known to commerce as shellac. The same plants produce lac dye. Professor Stillman suggested that California might compete with British India in supplying this valuable product. Mr. B. B. Redding said that

these lac-yielding plants were as plentiful as sage-brush from Southern Utah to New Mexico, and from the Colorado Desert to Western Texas.

The lac is most abundant around stations on the Mojava and Colorado deserts, and exudes as the result of an insect's sting. Calcutta exports a million pounds sterling in value annually of shellac, selling at 25 to 35 cents a pound, and almost as much more of lac dye, selling at 30 to 40 cents a pound. In 1876 the United States imported 700,000 pounds of shellac alone. To collect this is simple work for boys, and will prove an important industry. It will require little or no capital. The twigs are boiled in hot water and the gum rises to the top, is skimmed off, strained and dried on smooth stones and hand-pressed into flakes, ready to make sealing wax or varnish. The residue, when allowed to settle, makes lac dye. The plants live on a rainfall of three inches a year.

In vol. vi (Botany) of the Reports of the U. S. Geographical Surveys west of the 100th meridian we find the following information relative to these two plants, which would seem to be worthy the attention of commercial men and manufacturers:

P. 108—"Acacia Greggii, Gray.—A small tree, 10 to 20 feet high, pubescent or glabrous, unarmed or with scattered stout recurved prickles; pinnæ 2 or 3 pairs; on a slender petiole; leaflets, 4 to 5 pairs, oblong or oblong-ovate, 2 or 3 lines long, rounded or truncate above, narrower at base, rather thick and with 2 or 3 straight nerves; flowers in cylindrical spikes an inch or two long, the peduncles equaling or exceeding the leaves; pods thin, coriaceous, flat, 3 or 4 inches long by 5 to 7 lines broad, shortly stipulate, acute, curved, glabrous and reticulated, more or less constricted between the seeds; seeds half an inch long. From Western Texas to Southern California; collected in Western Arizona, 1872."

P. 41—"Larrea Mexicana, Moricand, *creosote bush*.—Common from Western Texas to Kern county, California, and southward to Mexico. Dr. Loew's examination proves that the reddish-brown exudate on the branches, caused by an insect, will yield a red coloring matter showing all the reactions of cochineal. 'The alcoholic extract of the leaves, on evaporation, yields a greenish-brown residue, of a specific and somewhat disagreeable odor, more strongly perceptible on boiling the extract with water. This residue is only to a small extent soluble in water, and the solution has an acid reaction. It yields a light yellow

precipitate with acetate of lead. The part of the alcoholic extract that is insoluble in water is easily soluble in alkalis. It also dissolves in nitric acid at a moderate heat, whereby oxidation takes place. On addition of water a yellow, brittle mass is precipitated. The Mexicans are said to use an infusion of the leaves for bathing in with good effect in rheumatic affections." (Also vol. iii, Wheeler's Reports)

P. 80—"Larrea Mexicana, Moric (*L. glutinosa*, Englemann), Valley of the Gila, Arizona.—This shrub is especially common on the hills bordering the Gila, also on the sandy wastes adjacent to Tucson and Camp Lowell, in Arizona, even imparting its strong odor to the air."

In the third volume of these reports this plant is also called stink-weed and etiontio.—*Scientific American*, April 10, 1880.

CHIAN TURPENTINE.

BY WILLIAM MARTINDALE.

This drug, the oleo-resin from *Pistacia terebinthus*—having until lately fallen into desuetude—since the appearance in the "Lancet"¹ of an article recommending its use in cancer of the female generative organs has been much in request. Owing to the small demand for it very little has of late years come into the market, and it has been stated that much of what has been supplied to the trade is factitious. There is little doubt, with the demand now created, plenty of the genuine article will be forthcoming in time.

The history of its use in medicine seems to be lost in antiquity. It was always more prized by the Greeks than the pinaceous oleo-resins. It has principally been obtained from the Island of Scio; here, as well as on the other islands of the Archipelago, Cyprus, Asia Minor and Syria, the tree is cultivated, and flourishes to the greatest perfection. It attains the height of 40 feet or more in favorable localities, but in others it grows as a stunted, straggling shrub, and is found as far east as Afghanistan and west as the Canary Islands. The yield of the oleo-resin from a tree 4 or 5 feet in circumference is only about 10 or 11 ounces yearly. A great part of it exudes spontaneously, but more of it is obtained by making incisions into the trunk and branches in the spring, from which the turpentine continues to flow during the whole summer. It is collected in the morning, after the coolness of the

¹"Lancet," vol. i, 1880, p. 477.

night has somewhat solidified it, from the stem and flat stones placed at the foot of the tree to receive what may have run down.

Chian turpentine has been omitted from the British Pharmacopœias, but was official in the London Pharmacopœias. Royle states that it used to be taken chiefly to Venice, where it was in request for making the far-famed Theriaca. Pereira, Guibourt and Hanbury describe it, and their descriptions are rather conflicting. It has a very firm, honey-like consistence, yet is slightly brittle and becomes more so with age and exposure to the air, and even then it always takes the form of the vessel in which it is kept. It is translucent; small pieces appear yellow or brownish-yellow, but in mass it has a greenish-brown color. It has when fresh a distinctive odor, slightly like the pinaceous turpentines, but much more agreeable and aromatic, according to some resembling citron and jasmine; but there is always a background smell like that of mastic, which becomes more developed and distinct with age, when it has lost the more volatile portion, the essential oil. According to Pereira the turpentine-like odor is combined with the odor of fennel, and Guibourt says, when kept in a covered glass vessel the odor is strong and agreeable, analogous to that of fennel or the resin of elemi. It probably loses this rapidly. A specimen, bearing Guibourt's name, in the Society's Museum has now no trace of it, but the mastic odor is very persistent. If the fennel odor be very evident in it I should fear the sample was not genuine, as in a statement made in the "*Lancet*"¹ the writer says what is sold as Chian turpentine "is either greatly adulterated or a wholly factitious article, manufactured from black resin, Canada balsam and the essential oils of fennel and juniper." The taste of genuine Chian turpentine resembles that of mastic; it is agreeable and free from the characteristic bitterness and acidity of the pinaceous turpentines.

From its mode of collection even the genuine Chian turpentine is always contaminated with impurities, earthy dust, etc. Testing a number of what I have reason to believe are genuine samples, as well as some not genuine, I find they are all (mechanical impurities excepted) entirely soluble in ether and absolute alcohol. Still the genuine oleo-resin, as stated by Guibourt, leaves a little glutinous resin undissolved when treated with alcohol slightly diluted (I used rectified spirit, sp. gr. .838); yet this can scarcely be identical with the beta-resin or masticine of mastic, which is left undissolved when mastic is treated even

¹ "*Lancet*," vol. i, 1880, p. 541.

with absolute alcohol. The alcoholic solution of Chian turpentine reddens litmus paper. The pimaric acid of Canada balsam is not soluble in cold absolute alcohol, but admixture with other ingredients might render it so. I am unacquainted with any definite test for its purity.

In judging of its genuineness we must rely on its taste, odor and physical characters, as above described. It should, more especially, be not too fluid. The drug was considered by Dioscorides to be diuretic, stomachic and laxative.

In administering it for cancer (an application of it Mr. Tweedy has shown to be not new,¹) three formulas have been employed by Professor Clay: Pills, ethereal solution and an emulsion made from the latter. The pills consist of 3 grains of Chian turpentine and 2 grains of sulphur in each. Sulphur is a novel excipient and not a very good one, as the pills lose their shape. The excipient generally used and recommended in books for the purpose is calcined magnesia. Three grains of Chian turpentine and $1\frac{1}{2}$ grain of light magnesia make a pill which retains its shape tolerably well; but it is perfectly indigestible, barely losing one-tenth of its weight in passing through the body.

Some years ago² I was asked to prepare tar in a pilular form. The excipients mostly used for this—light magnesia and beeswax—have both the disadvantage of making the pills indigestible, and knowing the peculiar action lycopodium has of absorbing these oleo-resins I succeeded in making a very good pill with 2 parts of tar and 1 of lycopodium. I at the time also made some pills with 2 parts of American turpentine and 1 part of lycopodium, which kept their shape. Chian turpentine, although harder, I find requires a little more lycopodium to enable the pills to keep their shape; 3 parts with 2 parts of the powder make fairly good pills, but these also are not digested. Sugar is a no better excipient than sulphur in enabling the pills to retain their shape. The sulphur pills are digested, and perhaps no better formula can be devised. With any excipient the pills should not be made too hard. I have seen some pills of Chian turpentine coated which retained their shape well; but I should be inclined to doubt their digestibility.

The other formula used is an ethereal solution of 1 ounce of Chian turpentine dissolved in 2 fluidounces of absolute ether, the

¹ "Lancet," vol. i, p. 582.

² "British Medical Journal," vol. ii, 1875, p. 498.

resulting solution measuring slightly over 3 fluidounces, and an emulsion is prepared from this as follows:

R	Ethereal solution of Chian turpentine,	fl. ℥ss.
	Solution (mucilage) of tragacanth,	fl. ℥iv.
	Syrup,	fl. ℥i
	Sublimed sulphur,	grs. 40.
	Water,	to fl. ℥xvi.

Mix.

The sulphur appears to have been added because it was not wished to lose anything contained in the pills which had previously been proved to be of such service. Mix it as you will, the sulphur will separate from such a mixture and aggregate the resin in masses, first to the top and then at the bottom of the bottle. By using mucilage of acacia in place of mucilage of tragacanth a satisfactory mixture may be obtained by first putting the mucilage into the bottle, adding the turpentine solution, shaking and diluting with a little water; rub the sulphur with the syrup and pour into the bottle; fill up gradually with water, shaking after each addition of a little; or a good emulsion can be made, using either mucilage of tragacanth or mucilage of acacia, by omitting the sulphur altogether. This, as pharmacists, we are not warranted in doing, but the substituting of mucilage of acacia for mucilage of tragacanth is a deviation from the strict letter of the prescription which, with the leave of the prescribers, I have had recourse to.—*Pharm. Jour. and Trans.*, April 24, 1880.

THE PRODUCTION OF INDIGO IN BENGAL.¹

Indigo is almost entirely obtained from leguminous plants of the genus *Indigofera*, that cultivated in India being the *Indigofera tinctoria*, and that in America the *Indigofera anil*. The plant is grown in India, China, Java, the Antilles and Central America. It is planted either in the spring or the autumn, and generally in clayey soil. In India it has pinnate leaves and a slender ligneous stem, and, when successfully cultivated, rises to the height of 3, 5 and 6 feet. It is cut with pruning knives at the end of May, and as its growth is exceedingly rapid, two, and sometimes three crops are obtained, but the last crop, in its production of coloring matter, is not equal to the first. Mr. Kœchlin-Schwartz, in an article in the "Bulletin de la Société Industrielle de

¹ From the "Journal of the Society of Arts," April 30, 1880.

Mulhouse," gives some interesting particulars of the preparation of indigo in Bengal.

In this province of India, the indigo factories—in addition to filters, presses, a boiler, drying grounds and reservoirs—are provided with two rows of vats, each consisting of 15 to 20. These vats are constructed of brick-work, and covered over with a strong coating of stucco; they are generally from 18 to 20 feet square, and about 3 feet deep; the back row is nearly three feet higher than the front, and it is in the higher row of vats that the fermentation takes place. When the fermentation is completed, the liquid is turned off, and flows into the lower vats. The water of the Ganges, which is comparatively pure, and therefore well adapted for the purpose, is utilized in this process.

In the morning the plant is cut, taken to the factory, and loaded in the vats in the evening, one vat containing 100 packages or bundles, arranged in layers, on the top of which are placed transverse pieces of wood tightly wedged down, it being necessary that the plants should be well pressed, or the fermentation would not otherwise thoroughly take place. Water is then allowed to flow into the vats until the plants are submerged. The process of fermentation lasts from nine to fourteen hours, but depends entirely upon the temperature. To test the progress of the operation, a little of the liquid is drawn off into the lower range of vats; if it is of a pale straw color, the quantity produced will not be so abundant, but it will be of a superior quality than when the color is of a deeper yellow tinge. The color of the liquid after fermentation, and when it is drawn off, is always more or less of a deep yellow. It is allowed to remain some little time, then the water, while still warm, is beaten by twelve naked men armed with long bamboos. While this is going on, the higher range of vats is being emptied and cleared for another supply of the plants, seventeen workmen being employed in cleaning one vat. The liquid is beaten for two or three hours, and gradually becomes a pale green color, and the indigo forms into small flakes; it is allowed to remain half an hour, and the water is then turned off gently, corks placed at different levels in the vats, being one by one withdrawn. The water returns to the river, and the deposit, which resembles a thin scum, is carried through a trough into a deep trench. By means of a hand-pump, it is then brought up and boiled for a short time in order to prevent a second fermentation—which would cause it to turn black and be spoiled. It is allowed to remain about twenty hours, and then the boiling process

is again resorted to, which continues for three or four hours, when the boiling mass is poured off and strained through a filter. This filter is composed of a brick vat covered with stucco, 18 to 20 feet long, 6 feet wide, and about 3 feet deep; it is covered with bamboos, on which are spread rush mats, and over these a strong, well stretched linen cloth. On this cloth, after the liquid has been strained through, there remains a thick, deep blue paste, almost black.

The water which was in the vat, in flowing through the filter, leaves this deposit of indigo. The paste is then placed in small, solidly constructed wooden cases, perforated with small holes, and with a very strong linen cloth at the bottom; the cases are then covered with cloth, and a wooden lid perforated also with small holes; they are then pressed in a vise to extract every particle of moisture. When this operation is completed, the indigo is found in a large thick block, the cutting of which demands careful attention, and must be done very slowly. The blocks are then submitted to the action of the drying-ground, which consists of a large brick building of a good height, with windows furnished with closed lattices to exclude the rays of the sun, even thick bushy trees being planted all round the buildings to assist in keeping out the light. The cakes occupy from three to five days in drying, and are then sent to Calcutta. It is in this state that indigo is delivered into the market; its quality may be tested by its lightness or small specific gravity, and its bright color when rubbed with the nail. —*Pharm. Jour. and Trans.*, May 15, 1880.

THE ALKALOIDS OF POMEGRANATE BARK.¹

By C. TANRET.

In March, 1879,² the author announced that in pursuing his chemical investigation of pomegranate bark he had established the fact that pelletierine, the alkaloid previously isolated by him, is accompanied in the bark by three other alkaloids, two of which, like pelletierine, are liquid and one is crystallizable, all four being volatile. In the present communication the author describes the principal properties of these alkaloids and the method adopted by him for their separation.

In the first place a mixture of the salts of the alkaloids is prepared

¹ "Comptes Rendus," vol. xc, p. 695.

² "Comptes Rendus," vol. lxxxviii, p. 716.

by mixing the powdered bark with a milk of lime, exhausting with water, shaking the resulting liquor with chloroform and neutralizing the latter with dilute acid. A solution of the mixed alkaloids is thus obtained in which one or other of them predominates, according to the source of the bark. Two of the four alkaloids are displaced from their salts by bicarbonate of soda and two are not. This solution is therefore treated with an excess of bicarbonate of soda and shaken with chloroform, and this in its turn is agitated with dilute sulphuric acid. The resulting solution contains the sulphates of two alkaloids, to which the names of "methylnelletierine" and "pseudonelletierine" have been given. Caustic potash is then added to the first liquor, and upon repeating the treatment with chloroform and acid there is obtained a solution of the sulphates of "nelletierine" and "isopelletierine."

Methylnelletierine.—In isolating this alkaloid the author has adopted a method of fractional saturations. The mixture of sulphates obtained by treatment with bicarbonate of soda is partially decomposed by an alkali, then shaken with chloroform, and this afterwards with an acid. The methylnelletierine is concentrated in the first portion set free, and after this treatment has been sufficiently repeated a point is reached at which the rotary (dextro) power of the product is no longer augmented, and the salt so produced the author considers to be pure. To obtain free methylnelletierine a concentrated solution of one of its salts is decomposed by an alkali, and the alkaloid liberated is dehydrated over fragments of potash and distilled in a current of hydrogen.

This alkaloid is liquid. Analysis of its hydrochlorate, which has a rotatory power of $\alpha_d = + 22^\circ$, gave results corresponding with the formula $C_{18}H_{31}N_2O_2$. It dissolves in twenty-five times its weight of water at $12^\circ C.$, is very soluble in alcohol, ether and chloroform, and boils at $215^\circ C.$

The salts of methylnelletierine are extremely hygrometric.

Pseudonelletierine is a crystalline alkaloid, and is obtained by concentrating the liquid from which the methylnelletierine has been removed, treating it with caustic potash and shaking with ether. Upon evaporation of the solvent crystals are left, which can be obtained quite pure by repeated recrystallization. The composition of this alkaloid is represented by the formula $C_{18}H_{30}N_2O_2$.

Pelletierine.—The solution of sulphates obtained by the action of caustic alkali is evaporated over sulphuric acid, and when the residual mass is dry it is exposed to the air upon folds of blotting paper. It

soon partially deliquesces, leaving on the surface of the paper scarcely hygrometric crystals, consisting of sulphate of pelletierine. The salt which penetrates the paper, and which, if care be taken at the time to prevent its exposure to the air, has no rotatory power, is the sulphate of isopelletierine.

The pure alkaloid is obtained by the same process as methylpelletierine, the precaution being used of distilling at a low pressure, ebullition at the ordinary temperature altering it rapidly.

Pelletierine is a liquid and colorless alkaloid when just obtained in a current of hydrogen, but it is remarkable for the rapidity with which it absorbs oxygen and resinifies. Its density at zero is 0.988. Analyses of its chloroplatinate and hydrochlorate lead the author to assign to it the formula $C_{16}H_{30}N_2O_2$. The alkaloid is soluble in the cold in twenty times its weight of water, of which it dissolves its own weight. It is soluble in all proportions of ether, alcohol and chloroform. At the ordinary pressure it boils at $195^{\circ}C$., distilling then with partial decomposition. Under a pressure of 10 centimeters the boiling point is lowered to $125^{\circ}C$.

Sulphate of pelletierine has a rotary power of $\alpha_d = -30^{\circ}$. If the free alkaloid be heated to 100° the rotatory power disappears.

Salts of pelletierine lose a portion of the base when heated either dry or in solution.

Isopelletierine is isolated in the manner just described. It is a liquid alkaloid, without action upon polarized light. Analysis of the hydrochlorate gave results corresponding to the same formula as pelletierine, of which it may be considered an isomer. Its density, solubility in water and boiling point are the same as those of pelletierine.—*Pharm. Jour. and Trans.*, April 17, 1880.

NOTES ON INDIAN DRUGS.

BY W. DYMCK.

CURCUMA Sp.? AMOMACEÆ. *The rhizome. Vernacular: AMBEHALDI, JANGLI-HALDI (Hind., Beng, Bomb.); KASTURI-MANJAL (Tam.)? KATTU-MANNAR (Malay)?*

History, Uses, etc.—This rhizome is the *zêdoaire jaune* of Guibourt, who tells us that the plant which produces it has been well described and figured by Rumphius. It is his *Tommon bezaar* or *Tommon primum*, which has been wrongly referred by most writers to the *Curcuma*

Zedoaria of Roscoe (Confer. Guibourt, "Hist. Nat.," 6ème éd., tome ii, p. 214). It would appear also that it is identical with the cassumunar described by Pereira and the turmeric colored zedoary of Ainslie. (Confer. Pereira, "Mat. Med." vol. ii, part i, p. 236). Lastly it would appear to be the same as the Cochin turmeric noticed by Flückiger and Hanbury ("Pharmacographia," p. 580). The properties of this drug are very similar to those of turmeric, but its flavor is not so agreeable; in Bombay it is used medicinally in combination with other drugs as an external application to bruises, sprains, etc.

The plant grows wild in the Concan. I have not seen it in flower. The foliage is like that of the *C. Zedoaria*, Roscoe, pale yellowish-green with a purple stain down the midrib of the leaf. A good deal of the drug is sent from Bombay to Europe, where it appears to be used as zedoary. A European chemists' firm in Bombay, writing home for zedoary root, was supplied with this article. The name cassumunar is probably a corruption of the Malay Kattu-mannar.

Description.—Central rhizome oblong or conical, often more than two inches in diameter, external surface dark grey, marked with circular rings and giving off many thick rootlets; lateral rhizomes about as thick as the finger, with a few fleshy rootlets; at the ends of some of the rootlets are orange-yellow tubers about the size and shape of an almond in its shell. Internally the central and lateral rhizomes are of a deep orange color like turmeric. The odor of the fresh root is like turmeric, but more camphoraceous.

Microscopic Structure.—Similar to that of turmeric.

Commerce.—The Bombay market is supplied from the Malabar coast. Value, unpeeled Rs. 24 to 25 per kandy of $5\frac{1}{2}$ cwt.; peeled Rs. 24 to 27. I have the plant in cultivation, but it has not yet flowered. Can it be the *C. zanthorrhiza* of Roxburgh?

CURCUMA AROMATICA, Salis. *AMOMACEÆ*. *The rhizome. Vernacular: KACHOORA* (Hind., Beng., Bomb.).

History, Uses, etc.—This plant affords the round zedoary of Guibourt, which he tells us is the zerumbet of Serapion, Pomet and Lemery. The following is his description of the drug: "The round zedoary is greyish-white externally; heavy compact, grey and often horny internally, having a bitter and strongly camphoraceous taste, like that of the long zedoary, which it also resembles in odor. The odor of both drugs is analogous with that of ginger, but weaker unless the rhizome be powdered, when it develops a powerful aromatic odor similar to that of

cardamoms" ("Hist. Nat.," 6ème éd, tom. ii, p 213). The round zedoary is one of the two zurambáds (zerumbets) described by Mahometan writers, the other being the nar kachoorá of India, which does not appear to be known in Europe.

Description.—Guibourt's description already given agrees exactly with the kachoorá of India, but it is often cut into transverse slices instead of into halves and quarters.

Microscopic Structure.—This is essentially the same as that of turmeric, but the resin and essential oil in the cells are of a yellowish-white color, and the greater portion of the starch grains are ovoid or pyriform instead of narrow and elongated as in turmeric.

Chemical Composition.—Zedoary contains, according to Bucholz ("Répert Pharm.," xx, p. 376), volatile oil, a bitter soft resin, a bitter extractive matter, gum, starch, etc. The oil is turbid, yellowish-white and viscid, has a camphoric taste and smell, and consists of two oils, one lighter, the other heavier than water. Trommsdorff obtained from the root a substance which he called zedoarin, but did not further describe it (Watt's "Dict. of Chem.," vol. v, p. 1066).

Commerce.—The Bombay market is supplied with Kachoorá from the Madras Presidency. Value, Rs. 20 to 30 per kandy of 7 cwt.

CURCUMA Sp. AMOMACEÆ. *The rhizome.* *Vernacular:* NAR-KACHOORA (Hind., Bomb.).

History, Uses, etc.—This drug is one of the two zurambáds of Arabic and Persian writers on materia medica and the nar-kachoorá of India. Strange to say it is not noticed by recent writers on Indian materia medica, though it is a well-known drug and to be found in all the shops. Meer Muhammad Husain states that the plant blossoms from the centre of the leaves like turmeric, which it also resembles in foliage. Can it be the *C. viridiflora* of Roxburgh and tommongiring *seu* giri of Rumphius (Amb. 5, 169)?

Description.—The drug consists of small globular central tubers, from which spring numerous lateral rhizomes about the size of the little finger. It is of a dark grey color externally and marked with circular rings; internally it is very hard and horny, of a greyish-orange when cut in thin slices; odor camphoraceous, taste bitter and camphoraceous.

Microscopic Structure.—The minute structure of this rhizome hardly differs from that of the zedoary. The starch contained in the parenchyme cells has been altered by heat and appears as a finely granular mass nearly filling the cell. The resin cells are about as numerous as

in the zedoary, but the contents are of a dull orange color. The vascular system consists of scalariform and spiral vessels, most numerous at the junction of the central and cortical portions of the rhizome.

Commerce.—This drug is said to reach Bombay from Cawnpore. Value, Rs. 4 to 5 per maund of 41 pounds.

ALPINIA OFFICINARUM, *Hance*. AMOMACEÆ. *The rhizome. Vernacular:* CHOTA-KULIJAN, CHOTE-PANKI-JAR (Hind., Beng., Bomb.); SHITTA-RATTAI (Tam.).

History, Uses, etc.—Although this drug has been long known its botanical source was only discovered in 1870, when a description of the plant was communicated to the Linnean Society of London by Dr. H. F. Hance, made from specimens collected by M. E. C. Taintor near Hoihow in the north of Hainan (Confer. "Journal of the Lin. Soc.," 1873, xiii, p. 6). Galangal is not much used in Hindu medicine. In Sanskrit works it is called "khulinjāna," evidently a corruption of the Arabic khulanjān. Mahometan writers suggest that the drug may be the root of very old plants of *Piper Betle*, but they are evidently in doubt about its being produced by that plant (Confer. "Makhzan," article "Khulanjān"). Meer Muhammad Husain describes galangal as tonic, stomachic, carminative, stimulant and aphrodisiac. He tells us that if given to young children it makes them talk early, and that a paste of the powdered drug made with oil or water will remove freckles. The Persian name is khusrodāru. Galangal is one of the ingredients of Warburg's tincture. It is not used in English medicine, but there is a considerable demand for it in Russia. Irvine ("Med. Topog. of Ajmeer," p. 171) says that the natives add kulijān to bazar spirit to make it more intoxicating.

Description.—The dried rhizomes are about as thick as the little finger or often less. They have evidently been cut into short lengths (2 to 3 inches) while fresh; many of the pieces are branched, and all are marked by numerous circular ridges of a light color. The external surface of the rhizome is of a deep reddish-brown; the interior pale red, hard and tough; the odor is aromatic and the taste hot and spicy.

Microscopic Structure.—The bulk of the rhizome consists of a uniform parenchyma traversed by fibro-vascular bundles. Some of the parenchyme cells are full of resin and essential oil, but most of them contain large starch grains of an elongated or club-shaped form.

Chemical Composition.—Galangal contains from $\frac{1}{3}$ to $\frac{1}{2}$ per cent. of an essential oil, which is the odorous principle. According to Vogl its

formula is $C_{10}H_{16}O$. Brandes extracted from galangal with ether a neutral, inodorous, tasteless crystalline body, kampferide, which requires further examination. The resin, which is probably the acrid principle, has not been examined.

Commerce.—Galangal arrives in Bombay from Canton and other Chinese ports. The imports are about 400 quintals yearly. Value, Rs. 3 8a. per maund of $37\frac{1}{2}$ lbs.

THE GREAT GALANGAL, though not so much used as the lesser, is well known in Bombay as baré-pân-ki-jar, malabáree-pân-ki-jar or kost-kuliján. The native dealers all state that it is imported from the Malabar coast. This drug is generally considered to be produced by the *Alpinia galanga*, Swartz, a native of Java. It is easily distinguished from the lesser galangal by its larger size, orange-brown exterior and yellowish-white interior. It is also less aromatic and pungent. Value, Rs. 50 per kandy of 7 cwt.

HEDYCHIUM SPICATUM, Smith. AMOMACEÆ. *The rhizome. Vernacular:* KAFUR-KACHRI, KAPOOR-KACHRI (Hind., Beng., Bomb.); SHIMAI-KICH-CHILIK-KIZHANGU (Tam).

History, Uses, etc.—I have not met with any account of this drug in native works on materia medica, which seems strange, as it is very well known and a considerable article of commerce in India and China, and is also exported to Europe. Two kinds of kapur-kachri are found in the Bombay markets, viz., Chinese and Indian. The latter was supposed by Royle to be the sittaritte or lesser galangal of Ainslie ("Mat. Ind.," vol. i, p. 140), but Moodeen Sheriff states that the sittarittie of the Tamils is the true lesser galangal, which statement appears to be correct. Kapur-kachri is used in perfumery and to preserve clothes from insects. The Indian is preferred.

Description.—Indian kapur-kachri occurs in slices, mostly circular, but sometimes the section is made in a sloping direction. The slices are half an inch or less in diameter, and vary much in thickness; they are white and starchy, and when freshly pared exhibit a faint line dividing the cortical from the central portion. The edges of each slice are covered by a rough reddish-brown bark, marked with numerous scars and circular rings; here and there rootlets remain attached. The odor is like that of orris-root, but more powerful and strongly camphoraceous. The taste is pungent, bitter and aromatic. Chinese kapur-kachri is a little larger than the Indian, white and less pungent. The bark is smoother and of lighter color.

Microscopic Structure.—The rhizome consists of a delicate parenchyma, most of the cells of which are loaded with large ovoid starch grains; a few contain a yellowish resin and essential oil. The epidermis is composed of several rows of compressed, nearly empty reddish-brown cells. From the unaltered condition of the starch it appears that the rhizomes are not exposed to heat.

Commerce.—The Indian drug is said to be imported from the Malabar coast. The other kind comes from the Chinese ports. Value, Chinese, Rs. $4\frac{1}{2}$ per maund of $37\frac{1}{2}$ pounds; Indian, Rs. 5. The Arabs and Persians are the chief consumers.

KAMFFERIA ROTUNDA, Linn. AMOMACEÆ BHUICHAMPA of India.

This does not yield any of the zedoaries of commerce. It is commonly cultivated in gardens on account of the beauty and fragrance of its flowers, which appear in the hot weather before the leaves spring up. The fresh tubers are pounded, and applied by the natives to wounds, bruises and swellings. The root consists of several central, almost globular rhizomes, from which proceed numerous thick, fleshy rootlets, all of which terminate in small round tubers. The substance of the rhizomes is of a pale straw color, and has a bitter, pungent, camphoraceous taste, much like that of the true zedoary.—*Pharm. Journ. and Trans.*, April 17, 1880.

THE TESTING OF COMMERCIAL QUINIA SULPHATE.

The vast importance of quinia as a remedial agent, surpassing as it does that of almost all other medicines, is now so generally acknowledged that it is not surprising to find considerable attention directed to the means by which the purity of the salt most frequently met is to be ascertained. Some years ago there was published in this journal a description of a method for testing sulphate of quinia devised by Dr. G. Kerner, and based upon the differences existing between the solubilities of the sulphates of cinchona alkaloids in water and between the solubilities of the several alkaloids in dilute solution of ammonia.

That method of testing was a great improvement upon the test recommended by Zimmer and Liebig, based upon the differences in the solubility of quinia and other cinchona alkaloids in ether; it was on that account adopted in the German Pharmacopœia, but has not yet received further official recognition. The consequence has been that the results obtained in testing sulphate of quinia as to purity have

not always been of such a nature as to decide the question satisfactorily or at all, and it is somewhat notorious that sulphate of quinia has very frequently contained such an amount of cinchonidia sulphate as to be very far from entitled to rank as a pure preparation. That this should be the case is to a great extent intelligible from the circumstance that of late years it is said there has been in the manufacture of quinia a much larger use of those varieties of cinchona bark that contain considerable amounts of cinchonidia.

Three years ago attention was directed to this subject at an evening meeting of the Pharmaceutical Society, and it was shown that several commercial samples of quinia sulphate contained from 5 to 10 per cent. of cinchonidia sulphate. It was also shown that the indications furnished by the test directed in the British Pharmacopœia were not such as to give evidence of this impurity, and that there was really no difference between the result obtained in testing such samples and that obtained in testing really pure quinia sulphate. At that time it was suggested that a test based partly upon the different solubilities of the sulphates of quinia and cinchonidia in water, and partly upon the different solubilities of the corresponding alkaloids in ether, would be more useful for ascertaining the purity of quinia sulphate than either the test of the British Pharmacopœia or even that introduced years before by Dr. Kerner. Somewhat later almost exactly the same mode of testing quinia sulphate was recommended by Dr. Hesse, who described a form of apparatus in which the operation was to be conducted, and laid down rules by which some approximative estimate might be formed as to the amount of impurity present in the quinia sulphate operated upon.

It is in regard to this point that there is the greatest difficulty in obtaining trustworthy results by any of the known methods of testing quinia sulphate. Even with Kerner's test applied volumetrically the results obtained are liable to vary under the influence of slight differences of the conditions of experiment, and at the time when that test was introduced the knowledge of the alkaloids associated with quinia was sufficiently imperfect to give rise to additional uncertainty; now, however, it may be taken as certain that in almost every case the impurity met with in commercial quinia sulphate is nothing more nor less than cinchonidia sulphate. The great solubility of cinchonidia sulphate as compared with quinia sulphate is alone almost a guarantee that it cannot be present in a well prepared sample of quinia sulphate. As regards quinidia, again, the probability of its occurrence is very

slight, for it must be remembered that there are but few kinds of cinchona bark which contain so much quinidia that its sulphate is likely to remain mixed with recrystallized quinia sulphate.

Quite recently, another paper on the subject has been published by Dr. Kerner, in which he specially refers to the misconceptions and errors which he thinks have arisen from Dr. Hesse's recommendations of a method for judging as to the quality of commercial quinia sulphate, and in justification of this view he instances the statement in a paper by Dr. Schacht, of Berlin, that a certain sample of quinia sulphate, tested as Dr. Hesse directs, gave a result showing that it contained "at least 3 per cent. of cinchonidia sulphate." He there mentions having long ago made use of the method recommended by Dr. Hesse, and based essentially upon the fact that cinchonia, quinidia and cinchonidia dissolve less readily in ether and separate from the ethereal solution more quickly when they are associated with very little or no quinia; but he adds that his experience at that time led him to regard this mode of testing as not being practical and trustworthy enough for its adoption as an official quinia test. He gives several reasons which lead him to infer that quantitative estimations according to the time the appearance of crystals in the ether solution takes place are altogether precarious and untrustworthy, and then goes on to state that the ammonia test carefully applied is so much more safe and delicate that it will admit of approximate determination of the impurities in commercial quinia sulphate, besides giving positive evidence of purity in the case of samples that are free from associated alkaloids.

We propose publishing in an early number of this journal a *résumé* of the directions given by Dr. Kerner for applying the ammonia test in order to ascertain the character of commercial quinia sulphate, and also for the purpose of determining more precisely the actual quantities of impurity present, and will now only mention one other point which he deals with, viz., the amount of water in the quinia sulphate of trade. It is well known that this salt normally contains a considerable amount of water of crystallization, and that this water is readily lost by efflorescence. Besides this, the voluminous character of the salt enables it to hold mechanically a variable excess of water to such an extent, as Dr. Kerner states, that apparently dry samples may be met with containing as much as 18 per cent. of water. It is also stated that such a result is not unfrequently brought about by devices of the manufacturer and by intentional moistening of the salt after it has

passed from his hands into commerce. Dr. Kerner suggests that the best remedy for this state of things would be to substitute the hydrochlorate in place of the sulphate, inasmuch as it is a more constant salt, and it has been found to possess advantages from a therapeutical point of view.

Still, since quinia sulphate is the official preparation and the one in general use, the question as to the amount of water in a sample is, as Dr. Kerner insists, one of importance as regards the determination of relative value of that sample; but at the same time he points out that it is not easy to decide what may reasonably be required in this respect, and that it is still less easy to determine quickly the amount of water in a sample of quinia sulphate than it is to detect minute traces of cinchonidia not indicated by the ammonia test. In most manuals of chemistry the neutral quinia sulphate is represented by the formula $2(C_{20}H_{24}N_2O_2)H_2SO_4 + 7H_2O$, according to which the percentage amount of water would be 14.45. Dr. Hesse adopts formulæ with $7\frac{1}{2}$ and even 8 molecules of water, but Dr. Kenner has invariably found the loss of weight by drying at $115^\circ C.$ to vary between 14.38 and 14.80 per cent. when the fresh salt pressed between the blotting paper and protected from efflorescence was operated upon. Consequently, he adopts the corresponding formula as correct, and as he considers it is impracticable in factory operations to prevent efflorescence altogether, while thoroughly removing all mechanically adherent water, he concludes that it must be regarded as a well founded requirement that official quinia sulphate should not at the utmost lose more than 14.6 per cent. of its weight when dried at $115^\circ C.$ As a general rule he considers the loss of weight in good samples would be only 13.8 to 14.4 per cent.

By exposure to dry air at a moderate temperature the crystallized quinia sulphate gradually loses five molecules of water, or 10.32 per cent., forming the compound $2(C_{20}H_{24}N_2O_2)H_2SO_4 + 2H_2O$, containing 4.6 per cent. water and 82.86 per cent. dry alkaloid. This salt is heavier than the above mentioned salt with seven molecules of water, and it has not so good an appearance, but it is constant, and though it can be thoroughly deprived of water of crystallization¹ even by drying at $100^\circ C.$, the anhydrous salt, $2(C_{20}H_{24}N_2O_2)H_2SO_4$, containing 86.86

¹ See Cownley On the Water of Crystallization in Quinia Sulphate, "Phar. Journ." [3], vii, p. 189.

per cent. of alkaloid is so hygroscopic that it again attracts from the atmosphere two molecules of water more or less rapidly according to the humidity of the air.

Consideration of these facts leads Dr. Kerner to suggest that the constant salt with two molecules of water should be made official, with the view of preventing improper introduction of water or loss to druggists by efflorescence, and of ensuring the administration of quinia in precisely the doses desired. Meanwhile, however, he recommends the practice of making a determination of the amount of water an element in the valuation of commercial quinia sulphate, as being more important than the testing for such traces of cinchonidia as fail to be indicated by the ammonia test.

We share this view of the desirability of taking the percentage of water into account in testing quinia sulphate more thoroughly than we do that which gives a preference to the ammonia test, and are disposed to think that the modification of that test in which ether is used to ascertain the solubility of the alkaloid remaining in solution as sulphate after recrystallizing the sample in question from water will furnish a more intelligible result than any other we know of. The quantitative determination of the amount of impurity is, however, a matter requiring some considerable skill in analytical operations, and as regards anything less than 1 per cent. it may in general be dispensed with altogether for all practical purposes.—*Pharm. Jour. and Trans.*, July 10, 1880.

VARIETIES.

Iodide of Starch as an Antidote.—In a memoir read before the Medical Society of Florence, Dr. Bellini recommends iodide of starch as an antidote for poisons in general ("La Presse Méd. Belge"). This compound has no disagreeable taste, and has not the irritant properties of iodine; hence, the author concludes that it may be administered in large doses. It may be given without fear in all cases where the poison is unknown. It will be found very efficacious in poisoning by sulphuretted hydrogen gas, the alkaloids and alkaline sulphides, ammonia, and especially by alkalis with which iodine forms insoluble compounds. In this respect it is preferable to iodated tincture of iodine. It aids in the elimination of salts of lead and mercury. In cases of acute poisoning an emetic should be given before the antidote is administered.—*Med. Press and Circular*.

Tartrate of Morphia.—The new preparation of neutral tartrate of morphia is a useful adjunct to our therapeutics. Being very soluble, it passes quickly out of the

system, and gives less of the unpleasant after-effects than either the muriate or acetate. Its great solubility makes it particularly advantageous for subcutaneous injection. It gives little smarting or irritation when thus administered, and the solution never clogs the finest needles.—*Med. Press and Circular*, from *Ibid.*

A Perfect Solution of Salicylic Acid.—

R	Salicylic acid,	i-℥ viii
	Citrate of potash,	ii
	Glycerin,	℥ viii
	Simple elixir, q. s. to make	O i.

The citrate is to be dissolved in glycerin by the aid of a little heat, after which the acid is to be stirred in and a gentle heat maintained until it is completely dissolved. On cooling, simple elixir is to be added to bring it up to the required measurement. The solution is then to be strained, and when prepared with a colorless elixir is of the color of a very pale cherry. It contains five grains of salicylic acid to the fluidrachm, and is miscible in all proportions with water without the separation of any acid.

The above appears in the Louisville "News," the editor of which says it is "the best solution of salicylic acid he has ever used."—*Ohio Med. Recorder*, June, 1880.

Quebracho.—This new Brazilian remedy has lately been experimented with by Benzoldt of Erlangen ("Berlin Klin. Woch.," ch. 4—"Med. Jour.>"). On frogs and other lower animals he found that it produced complete paralysis of the motor system, of central origin, terminating in death by implication of the respiratory muscular system. In cases of dyspnoea and cyanosis, especially if associated with rapid pulse and respiration depending upon pulmonary affections, he found the drug to possess qualities promising a wide range of usefulness. Thus in cases of emphysema, complicated with pleuro-pneumonia, a considerable reduction of the frequency of the pulse and respiration, with corresponding relief of the subjective symptoms, and a general improvement was noted. Other similar cases afforded similarly favorable results. He attributes this effect to increased absorption of oxygen by the blood, as it was found on mixing freshly drawn blood with the fluid abstract of quebracho, that the former assumed a much brighter hue than did blood simply exposed to the air. In several cases of emphysema and other pulmonary affections, Dr. Langman obtained the sensations of relief and general improvement. The preparation employed is a fluid extract from the bark, the strength being 1 to 2. The dose was a fluidrachm, two or three times a day.—*Detroit Lancet*, June, 1880.

Pilocarpin in the Treatment of Prurigo.—Professor Oscar Simon, of Breslau ("Berlin Klin. Woch.," No. 49, 1879), reports good results from the use of jaborandi and pilocarpin in prurigo. According to Prof. Simon, the remedy softens the dry, harsh skin, and probably relieves the openings of the sweat ducts of the accumulation of epidermis, which, as the microscope shows, blocks them in prurigo.

On the average, a fortnight's pilocarpin treatment temporarily cures moderately severe cases of prurigo, while a month suffices for all but the very worst. Either subcutaneous injections of hydro-chlorate of pilocarpin (20 milligrams) or a syrup

of jaborandi were used; the latter is prepared by dissolving 18 parts of sugar in an infusion of jaborandi leaves, 3 parts, in water 15 parts. A dose for an adult is two or three tablespoonfuls, for children one or two teaspoonfuls. After the dose the patient was always wrapped up in blankets for two or three hours. The salivation and other well-known effects of pilocarpin accompany the sweating, which seems so valuable to the pruriginous patients. Prof. Simon has not found pilocarpin of use in other skin affections.—*Ibid.*

Oleate of Lead in Eczema.—James Sawyer, M.D., writes in the "British Medical Journal": After I had used for several months, both in hospital and in private practice, the ointment of oleate of zinc (for which the profession is indebted to Dr. Crocker, and which is certainly one of the best local remedies for eczema), I expressed my testimony in its favor in the issue of this journal for April 19, 1879. Thinking an oleate with lead for the base instead of zinc would be likely to prove a serviceable alternative application in eczema, especially when the soothing effects of lead might be desired, I asked Messrs. Southall, of Birmingham, to make for me an ointment of oleate of lead. After a series of experiments they produced an excellent preparation according to the following formula: Lead oleate, 24 parts; heavy and inodorous paraffin oil, 14 parts. The lead oleate is prepared by heating a mixture of oleic acid and oxide of lead. After using it for many months I can recommend this ointment as a very efficient local remedy in eczema.—*Louisville Med. News*, June 19, 1880.

A New Disinfectant.—A new disinfectant has been introduced in Australia, composed of one part of rectified oil of turpentine and seven parts of benzin, with five drops of oil of verbena to each ounce of the mixture. Its purifying and disinfecting properties are due to the power possessed by its ingredients of generating peroxide of hydrogen or ozone. Articles of clothing, furniture, wall-paper, books and papers may be saturated with it without damage. When it has once been freely applied to any rough or porous surface its action persists for an almost indefinite period. This may be shown readily at any time by putting a few drops of a solution of iodide of potassium on the surface which has been disinfected, when the ozone, which is being continually generated, will quickly liberate the iodine from its combination with the potassium, giving rise to a yellow discoloration, or a blue if boiled starch has been added to the iodide of potassium solution.—*Ibid.*, June 12, 1880.

Inhalations of Benzoate of Ammonium in Pulmonary Phthisis.—Dr. Wagner, of Buda Pesth, writes, in "Med. Chir. Centralblatt," that he prefers this salt to the benzoate of sodium, on account of its being more volatile, and thus capable of penetrating deeper into the smaller bronchioles than the latter, and also because it decomposes easier, leaving free benzoic acid, the anti-bacterial effect of which is greater than that of either of its salts. He lets his patients inhale until a burning sensation is produced in the chest, when the breathing becomes less labored, the cough easier and the appetite increases.—*The Medical Press and Circular*.—*Cincinnati Lancet and Clinic*, July 3, 1880.

Artificial Slate is made by the "Combined Rubber-Goods Manufactories of Harburg and Vienna" by mixing in the machines used in caoutchouc manufacturies 16 parts of powdered pumice stone, 21 parts of animal charcoal, 10 parts of purified caoutchouc and 5 parts of sulphur. The mass is then rolled into sheets, heated, pressed and finally polished with pumice stone.—*Ber. d. Deutsch. Chem. Ges.*, xii, p. 2109.

French Polishing Rags, a new article of commerce for readily imparting bright polish to metals, and extensively advertised as "*Serviettes Magiques*," are made by saturating pieces of woolen cloth, about 70 centimeters in length and 10 cm. in width, with a mixture made by dissolving 4 grams Marseilles soap in 20 grams water, adding 2 grams tripoli and coloring red with a little fuchsin; the cloths are then allowed to dry.—*Pharm. Ztg.*, Nov. 29, 1879, p. 742.

A so-called **Gold Varnish**, suitable for protecting bright brass articles and for giving them an elegant appearance, is used by spreading over the metallic surface and heating immediately over an alcohol lamp in order to melt the ingredients. It may be made by any one of the three following formulas:

1. Seed-lac 200 parts, sandarac and mastic, each 80 parts, gamboge, dragons-blood and arnotta, each 20 parts, Venice turpentine 60 parts, red saunders 30 parts, and alcohol 1000 parts, digest and filter.

2. Shellac 10 parts, mastic 1 part, sandarac 1 part, powdered aloes 2 parts, powdered turmeric 5 parts, powdered saffron $\frac{1}{2}$ part, dragon's-blood 1 part, Venice turpentine $\frac{1}{2}$ part, and alcohol 100 parts; dissolve and filter. This varnish is applied thin with a fine brush to the surface previously well cleaned and heated to 30 or 35°C.

3. Sandarac 12 parts, mastic 6 parts, copaiba 2 parts, Venice turpentine 3 parts, oil of turpentine 4 parts, absolute alcohol 36 parts. This varnish is mixed with an equal quantity of a filtered solution of shellac 5 parts, dragon's blood 50 parts, and alcohol 50 parts.—*Pharm. Ztg.*, Dec. 3, 1879, p. 751.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Maryland College of Pharmacy.—The following gentlemen were elected officers of this College at a recent meeting for the ensuing year: President, Joseph Roberts; Secretary, Edwin Eareckson; Treasurer, Wm. H. Osborn; Examiner, Lewis Dohme. Officers elected in January, and holding over, are: Vice President, Wm. S. Thompson; Examiners—T. Hassencamp and N. H. Jennings. Messrs. L. Dohme, Chas. R. Rue, Jos. Roberts, T. Hassencamp and Edwin Eareckson were elected delegates to the American Pharmaceutical Association. Prof. J. Faris Moore, Chas. Caspari, Jr., and Wm. Simon, were elected delegates to the Convention of Teaching Colleges of Pharmacy.

Cleveland Pharmaceutical Association.—We note with pleasure that the druggists of Cleveland, Ohio, formed an association, known as the Cleveland Pharmaceutical Association, on the 13th ult., and elected the following gentlemen offi-

cers for the ensuing year: Daniel Meyers, President; S. P. Churchill, 1st Vice President; S. S. West, 2d Vice President; A. Mayell, Secretary; L. A. Cobb, Treasurer. Executive Committee—E. M. Hepler, W. H. Hartness, E. A. Shelentragher, M. L. Tray and L. Dreher.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

The Directory of Chemists and Druggists, as well as Chemical Manufacturers, Wholesale Druggists, Dry Salters, and other Kindred Trades in England, Scotland and Wales, as also the Principal Towns of Ireland. London: Kelly & Co., 51 Great Queen street, Lincoln's Inn Fields, W. C., 1880.

From the above title one can see how useful to any extending their business such a volume would be, whether as furnishing them with information when desiring to import, or finding out the best outlets for goods which they may feel they are able to sell to advantage abroad. The work is well arranged and distinctly printed, and can be had by writing as above. Price, fifteen shillings.

Nasopharyngeal Catarrh. By M. F. Coomes, M.D. Louisville: Bradley & Gilbert, 1880.

The above treatise upon a disease that has baffled the best efforts of the profession treats first of the anatomy of the parts involved, the various methods of treatment, both local and constitutional, of the various forms it assumes. Of course, it is out of our province to criticise.

The Catalogue of the Library of the Pharmaceutical Society of Great Britain, 1880.

The regulations of the library, the method of arrangement. The book is a pretty closely printed volume of 445 pages, and indicates about 4,500 titles.

OBITUARY.

JOHN J. FROST.—A note from Vincent Davis, Secretary of the State Board of Pharmacy of Kentucky, informs us of the death of Mr. John J. Frost, late President of the Pharmacy Board of that State, which took place in Lexington on June 1st. The following resolutions were passed by the Board:

Resolved, That, in the death of John J. Frost the State Board of Pharmacy has lost a prudent, wise and faithful officer and counselor, the profession of pharmacy an accomplished and conscientious member, and the community at large a valued citizen.

Resolved, That a certified copy of these proceedings be forwarded to the family of the deceased, with assurances of the sympathy of the members of this Board; also that a copy of the same be entered upon the records of the Board, and a copy sent to the Secretaries of the American and the Kentucky Pharmaceutical Associations.

W. H. AVERILL, *President*.

VINCENT DAVIS, *Secretary*.